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Holmes, Howard W.

Elimination of grade
crossings in Portland, Or.

Portland, Or.

1915

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ELIMINATION
of
GRADE CROSSINGS
in
PORTLAND, OREGON

A GENERAL DISCUSSION OF THE
PROBLEM TOGETHER WITH
PLANS, SPECIFICATIONS AND ESTI-
MATES OF COST FOR ELIMINAT-
ING THE GRADE CROSSINGS
ALONG THE RIGHT-OF-WAY OF
THE O.-W. R. & N. COMPANY IN
SULLIVAN'S GULCH

BY
HOWARD W. HOLMES
ASSOC. M. AM. SOC. C. E.



DEPARTMENT OF PUBLIC WORKS
PORTLAND, OREGON
1915

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DEPARTMENT OF PUBLIC WORKS
PORTLAND, OREGON
1915

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1915

LETTER OF TRANSMITTAL.

To

MR. ROBERT G. DIECK, Commissioner of Public Works:

MR. PHILIP H. DATER, City Engineer:

I have the honor to transmit a report on the elimination of grade crossings in Portland, together with plans, specifications and estimates of cost for elimination of the grade crossings along the right-of-way of the O.W.R. & N. Company in Sullivan's Gulch.

This report is the result of thorough investigation and study of the problem and I hope will prove of interest and value to you and to the Council in making final decision in the matter.

I wish to mention that very valuable services have been rendered by Capt. Geo. S. Edmondstone, who is in direct charge of design, and Messrs. M. L. Dowling, G. V. Gongwer and F. T. Fowler. The visualization of the structure at East 37th Street, prepared by Mr. Gongwer, is worthy of special mention.

Very respectfully,

HOWARD W. HOLMES,
Assoc. M. Am. Soc. C. E.

Portland, Oregon, February 16, 1915.

There has been completed a thorough investigation of the grade crossing problem throughout the city, with special attention to the elimination of the more important grade crossings along the right-of-way of the O.-W. R. & N. Company and plans, estimates and specifications for the necessary structures have been prepared.

GENERAL.

The elimination of grade crossings has developed into one of the most important improvements in railroad and municipal work, especially in the larger, rapidly growing cities. There is hardly a city of any size which has not some time agitated this question as an advance step in municipal improvement, and in a desire to remove a constant hazard to life and property. The condition is a result of rapid development and one which could not have been foreseen in the early days of railroad construction, for every railroad official would gladly eliminate crossings at grade, provided a just and practical scheme may be devised for their removal. The not infrequent disagreements between railroad and municipal officials over grade crossing elimination are, not as to their desirability, but as to considerations of finance and method. In recent years, special legislation and co-operation between railroad and municipal authorities have done much to solve the difficulties. The result has been a large reduction in grade crossing accidents and damage suits, and a general improvement in property and traffic conditions.

A large amount of this work has been done at enormous cost because not executed before expensive, permanent improvements had been made along the lines of railroad, necessarily often involving the almost complete destruction of these costly improvements. In a few cases the expense has been so great that the only solution has been the acquirement of a new right-of-way and construction of a new line. Elimination in large cities has meant a cost of over a million dollars for single crossings and in nearly every case an average of a hundred thousand dollars or more per crossing—whereas, if given earlier attention, not only would a saving of over 60 per cent have been accomplished, in the majority of cases, but countless accidents and deaths would have been avoided.

Responsibility for the existence of grade crossings rests not unequally upon the railroad and state and city officials. Track locations now regarded as inimical to public welfare were in many cases granted as inducements to railroad construction. The responsibility, therefore, should be frankly acknowledged by both sides.

PROBLEMS TO BE CONSIDERED.

In general, the problem has become one of great importance during the past ten years since the introduction of the electric street railway. The intersection of electric railways with steam railroads has greatly complicated conditions and made improvement imperative. There are so many things to be considered from the standpoint of both the public and the railroad that a comprehensive study is necessary before the adoption of any general plan. Procedure is governed by topography of the district, character of the railroad and street traffic, and improvements in adjacent territory. A complete study of traffic conditions, present and proposed industrial service, the disposal of materials from excavation and provision for traffic during construction, must be made.

In order to devise an equitable assessment district, in addition to the technical and engineering features of design, the area affected and benefited by the project in its entirety must be carefully studied. It is of utmost importance that the problem of grade separation be not considered as a series of individual cases. The plan proposed for any particular crossing may seriously affect the disposition of other crossings. Although, frequently, the need is first realized at one particular crossing, it is essential that this crossing be not considered by itself and its treatment be such as to restrict or hamper all future grade separation and make subsequent improvement unnecessarily costly. Realizing this fact, and profiting by the experience of other cities, we have here made a study of the entire situation and considered as a unit the series of crossings along the right-of-way of the O.-W. R. & N. Company, with due consideration to the location of additional viaducts as future development may require, and to the possible future elimination of all grade crossings within the city limits.

Concerning the railroad company, the change in gradient of the track system will affect:

- 1—The general efficiency of the road;
- 2—Railroad improvements along the right-of-way;
- 3—Industrial and service tracks;
- 4—Future development of the system;
- 5—Drainage of the right-of-way.

The latter factor is of major importance and must be given very careful consideration, sometimes at considerable expense.

It should also be noted that a railroad running through many cities must consider the demands of all and we should not fail to appreciate that other cities may make similar demands and that it would be almost impossible for the railroad to accede to all.

There are many elements of concern to the municipality. Reasonable gradients on approaches with least damage to abutting property must be secured. A change in grade of the street crossing the railroad may affect other streets in the vicinity and seriously interfere with present and future sewers and other improvements. Drainage and future street development must be accorded the same attention as is given railroad property. The importance of industrial service and provision for traffic movement during construction have already been mentioned.

It may be readily seen that the railroad and the municipality have many interests in common and that co-operation and agreement is of utmost importance. In this respect it should be mentioned that the Engineers for the Railroad Companies have co-operated with the city forces on every occasion and been of much assistance.

BENEFITS TO THE CITY.

Public safety is, of course, the greatest benefit derived by the city from grade crossing elimination. Injuries and deaths at grade crossings have caused an enormous economic loss. It has been substantially proved that gates and flagmen do not offer adequate protection regardless of elaborate and complicated protective system, for statistics show that over 28% of grade crossing accidents occur at protected crossings. It has been said that a

large number of the recent accidents have occurred because incompetent motor drivers allowed their machines to become stalled while attempting to cross on high gear. This statement is not well founded, for a large percentage of the most disastrous recent accidents at grade crossings have involved horse-drawn vehicles. The degree of hazard depends, of course, upon the view of the railroad from the highway, the character of approaches and of traffic using the crossing.

Another important improvement in the elimination of grade crossings is decreased delay to street traffic in general and to fire apparatus, the latter sometimes being of serious moment. The monetary value of such added security to life is, of course, difficult to estimate, but the benefit to property owners is direct in most cases, for grade separation is, among other things, invariably followed by more favorable street railway schedules and increased land values.

BENEFITS TO THE RAILROAD.

The elimination of grade crossings relieves the railway companies from enormous accident claims. Estimates based on statistics of the Interstate Commerce Commission indicate that an average of \$22,000,000 yearly is paid for personal injuries, not including the large items for legal expenses connected with personal injury claims. A complete elevation or depression of tracks eliminates, to a large extent, trespass nuisance. With public crossings at frequent intervals, it is almost impossible to keep persons from using the railroad as a thoroughfare. The presence of track-walkers leads to numerous accidents and deaths and delay to traffic. It is doubtless true that numerous wrecks and enormous freight damages are caused by unauthorized persons using the railroad right-of-way. The expense of crossing protection is also an important element, including the maintenance of mechanism, signs, flagmen and gatemen. The capitalized expense of crossing protection would, in many cases, go far toward paying the cost of grade separation.

With crossings at grade, trains are required to run through a city at slow speed. If cities are few and far apart this is not of much consequence, but in most districts causes a considerable aggregate delay. Grade separation furnishes an opportunity to

reduce gradients, to install more tracks and to improve arrangements for the separation of different kinds of service. With increased freight and passenger traffic, the latter is of prime necessity for both the railroads and the public, especially if suburban service is of any extent.

Although it is conceded that the electrification of all lines in important cities cannot be long delayed, electrification by a third rail system is practically impossible with tracks crossing city streets at grade.

BENEFITS TO STREET RAILWAY.

The elimination of delays now encountered by street cars is a noteworthy improvement resulting from the separation of grades. The same service can be rendered with less cars, a reduction in the original cost and in maintenance and repair of rolling stock. The installment and maintenance of derailing devices would also be reduced and the large item for maintenance of tracks at crossings would be eliminated. The continual expense and disturbance to traffic in the necessary maintenance work where the tracks on First and Second Streets cross Hawthorne Avenue and East Morrison Street and elsewhere, has no doubt been observed. Furthermore, the excessive wear on motor equipment occasioned by the fact that cars must either stop or slow down at the imperfect crossings, would also be avoided. The capitalized expense of this one item with a large number of cars would amount to a surprising figure. The liability of the company for damages is an important consideration and would be materially reduced. These crossings also cause continual disruption of car schedules, which are extremely difficult to maintain in Portland in any event. This delay is capitalized and well illustrated in an estimate by General Manager McMullen of the Pacific Electric Railway Co. of Los Angeles, in which it is stated that the cost of stopping cars at four crossings is \$48.00 per day, or \$17,520 per annum, equivalent to 5% interest on \$291,936. The writer is familiar with the crossings on which the above estimate is made and considers that in many respects considerably greater delay is encountered at some of our local crossings. The saving in this and other items noted may be conservatively placed at \$500,000 annually.

From the above discussion, it may be noted that, as far as results are concerned, *the railroad companies gain greater traffic facilities, reduction in damage claims and reduction in cost of operation and maintenance. The public gains protection against accidents, better traffic facilities, and shares in the advantages gained by the railroad companies.* The enormous amounts involved in grade crossing elimination in every city of any consequence in the United States and abroad is sufficient testimony of its worth.

ADVANTAGES AND DISADVANTAGES OF VARIOUS METHODS OF ELIMINATION.

Methods of grade separation may be generally classified as follows:

- 1—Elevation or depression of street with no change in the railroad grade;
- 2—Elevation or depression of railroad tracks with no change in the street grade;
- 3—Partial elevation or depression of railroad, combined with partial elevation or depression of street.

An attempt has been made to point out the principal advantages and disadvantages of each method:

1—ELEVATION OR DEPRESSION OF STREET WITH NO CHANGE IN THE RAILROAD GRADE.

This is the most natural method governing isolated crossings and is usually employed in country districts. In but very few instances has the plan been followed in cities except in the elimination of a single crossing. When the street must be completely depressed or elevated there results an enormous expenditure for property damages, long and steep approaches and an increase in trucking costs. The appearance of streets is greatly injured and, in most cases, the value of adjoining property considerably depreciated. In general, it may be stated that in every city where complete elevation or depression of the street has been accomplished by constructing viaducts or subways, the plan has proved to be exceedingly undesirable excepting under especial favorable topography. Of course, from the railroad operating standpoint, this method is advantageous inasmuch as traffic is but slightly

interrupted during construction and, in most cases, more economical industry service can be rendered.

2—ELEVATION OR DEPRESSION OF RAILROAD TRACKS WITH NO CHANGE IN STREET GRADE.

Whether the plan be general track elevation or depression depends much on the topography of the city; consequently elevation for a portion of the route and depression for another may develop to be the only feasible method. In general, it may be said that track elevation is more economical for the railroads, favors industries having sidetrack connections, and is somewhat advantageous to the city. On the other hand, track depression is more pleasing, aesthetically, and offers certain other advantages to the city.

A most important consideration is the effect of the change in gradient on the efficiency of the railroad, and, as the heavy high-speed traffic of today demands light grades, this factor may often govern. As railroads frequently enter cities at an elevation greater than that of the industrial or business section, it often happens that tracks may be elevated through the city with considerable improvement in gradients.

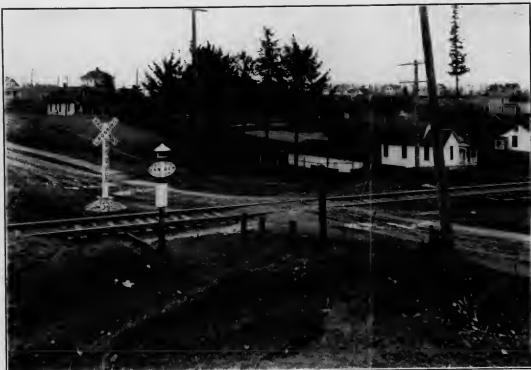
Elevation requires less vertical separation or grades because it is only necessary to provide clearance of about fifteen feet for highway traffic, while railroads demand a clearance of twenty-two feet above tracks. Other things being equal, this method appears to be more economical owing to the saving of over 30% in vertical separation. Elevation has a great advantage over depression in that sewer, water and gas mains, and other subsurface structures are in no way disturbed. Track elevation can be carried on without materially interrupting railroad traffic, with but comparatively small property damage, and with easy provision for the important factor of roadbed drainage. From an aesthetic viewpoint, however, track elevation is objectionable in residence districts. Noise on an elevated railroad is excessive and long embankments in no way add to the beauty of a district. It is, however, possible to design artistic bridges and, in some locations, to sod and maintain the slopes of embankments in a pleasing manner. Industrial service may, in many cases, be more easily provided from elevated tracks. It is also reasonable to assume that bulk materials can be unloaded more cheaply from

an elevated track than from a depressed track or a track on the level; however, under certain conditions, a spur may be extended to an industry on a reasonable grade from a depressed track, provided that this depression is not excessive.

3—PARTIAL ELEVATION OR DEPRESSION OF THE RAILROAD, COMBINED WITH PARTIAL ELEVATION OR DEPRESSION OF STREET.

This may be called a compromise plan, and, while partial elevation of tracks and partial depression of streets may be said to possess all the disadvantages of the methods previously discussed, the alternate method involving partial track depression and partial street elevation will prove to offer many advantages and to more evenly distribute the disadvantages observed in other methods. From an aesthetic standpoint the plan for a moderate elevation of the streets and a moderate depression of the tracks will be found to give decidedly better results. The railroad and its traffic will be largely hidden in the depression and the highways will have all the practical advantages afforded by an overhead crossing.

A decided improvement, also, is made in the matter of depreciated property as, in most cases, partial elevation of streets called for by this method has greatly improved the adjoining property. This method, however, loses many of its advantages if, in order to secure partial depression of tracks, it disturbs existing sewers, water and gas mains and other sub-surface structures. Effective drainage of the roadbed is of major importance and must, in this method, be given very careful consideration. In the eastern cities it has been found quite difficult to keep the tracks in the depression clear during the winter months, but, modern equipment is rapidly eliminating this trouble. In general, it may be said that in all cases where topography permits and a reasonable railroad gradient and well-drained roadbed may be obtained, the plan involving partial depression of the tracks will be found to offer many advantages from both an aesthetic and practical point of view, and will, by careful design and well-planned approaches, involve the least consequent damage and offer fewer difficulties in the lay-out of industrial sidings.



CROSSING AT EAST FIFTY-SECOND STREET



CROSSING AT EAST FIFTY-THIRD STREET

LOCAL CONDITIONS.

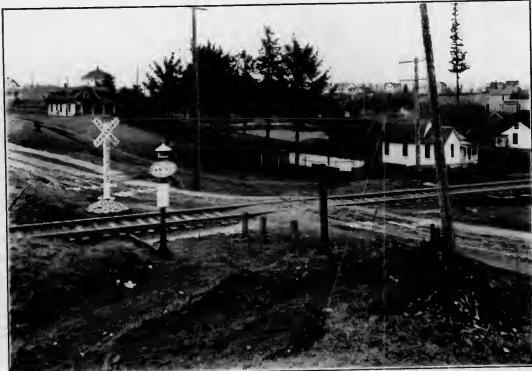
The principal obstacle in regrade work elsewhere has been the apportionment of cost. This was here adjusted in an amendment to the Charter adopted by the electorate in June, 1913, which definitely outlines the proceedings and fixes the apportionment of cost. Before adopting a general plan for the regrade in Portland, there was made an exhaustive study of the grade crossing problem throughout the entire city. The considerations detailed in the discussion under "Problems to be Considered" were thoroughly investigated from the standpoints of both the railroad and the municipality, and the entire project treated as a unit. Complete information was first obtained relative to the movement of traffic and types of street users. Precise levels were run, benchmarks established, and topographical surveys made and carefully studied to cover not only the property immediately adjoining the right-of-way, but the entire area likely to be affected by the project. Preliminary plans and comparative costs were prepared for eliminating the grade crossings by the following methods:

- 1—Complete depression of the railroad;
- 2—Complete elevation of the railroad;
- 3—Partial elevation of the highway combined with partial depression of the railroad.

Studies were also made of the present and proposed industrial service, disposal of materials from excavation, provision for traffic movement during construction, and plans considered for regrading certain areas close to the railroad right-of-way, utilizing a portion of the excavated material which, in some instances, may be very advantageously placed. Plans, also, were prepared for the substitution of earth fills without retaining walls for the various approaches.

After studying the project in its entirety and reviewing data on the practicality of various methods employed in other cities, the compromise system was chosen. This method, involving partial track depression and partial highway elevation, was found more nearly suited to topography and other local conditions, in practical utility and appearance, than any of the other methods; also proving to be the most economical when considering the location of additional viaducts which the future may require.

INTENTIONAL SECOND EXPOSURE



CROSSING AT EAST FIFTY-SECOND STREET



CROSSING AT EAST FIFTY-THIRD STREET

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After studying the project in its entirety and reviewing data on the practicality of various methods employed in other cities, the compromise system was chosen. This method, involving partial track depression and partial highway elevation, was found more nearly suited to topography and other local conditions, in practical utility and appearance, than any of the other methods; also proving to be the most economical when considering the location of additional viaducts which the future may require.

Plans and estimates were thereupon prepared under this method for a viaduct at East Thirty-seventh Street and Sandy Boulevard and for certain others which appear most necessary at present as a result of the change of grade at East Thirty-seventh Street, viz.:

East Forty-second Street,
East Forty-seventh Street,
East Fifty-second and Fifty-third Streets,
East Sixtieth Street,
Halsey Street (Barr Road),
East Seventy-fourth Street,
East Eighty-second Street.

It should be noted that although crossing plans are prepared for both East Fifty-second and East Fifty-third Streets, it is recommended that a crossing be provided at only one of these locations. In either case, the plans contemplate the construction of a cross street between Fifty-second and Fifty-fifth Streets, just north of the railroad tracks, so that there may be easy access to the crossing—whichever location the Council may select. From an engineering standpoint, Fifty-third Street offers a few minor advantages, but from the standpoint of general public benefit, Fifty-second Street seems to be the preferable location.

Figure 1 shows the location of proposed structures and their approaches. Although a viaduct is indicated at East 74th Street, its necessity is not yet urgent. In every case except at East 82nd Street it was found to be more economical to construct a skew bridge than to change the alignment of streets. At East 82nd Street a right angle crossing will prove most economical and, although necessitating a slight change in the alignment of the approaching streets, it makes possible a considerable saving in construction costs and reduces property damage.

The method adopted calls for a change in the gradient of the railroad tracks from a point 600 feet west of East 33rd Street, eastward to a point 100 feet west of the city boundary, at East Ninety-second Street, involving an average track depression of $1\frac{1}{2}$ feet. The present and proposed gradients are shown on the profile, Figure 1. While the proposed gradient offers a minimum rate of grade, the depression is not so great as to interfere with roadbed drainage or to necessitate the re-

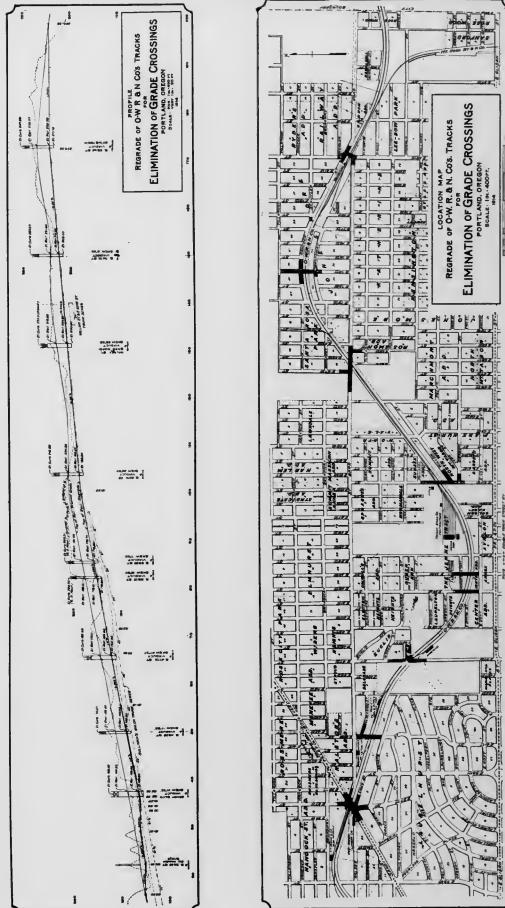


FIG. 2
ESTIMATES OF COST
FOR FIVE ALTERNATE PROPOSITIONS FOR THE ELIMINATION OF GRADE CROSSINGS ALONG THE RIGHT-OF-WAY OF
THE O.-W. R. & N. CO.
IN SULLIVAN'S GULCH IN THE CITY OF PORTLAND, OREGON.

COLUMN 1: O.-W. R. & N. Co.'s Tracks depressed 11'. Steel-Concrete Highway Bridges, Retaining Walls on all Street Lines.
 COLUMN 2: O.-W. R. & N. Co.'s Tracks depressed 11'. Steel-Concrete Highway Bridges, Earth Fill side slopes 1 1/2 to 1 on Private Property.
 COLUMN 3: O.-W. R. & N. Co.'s Tracks depressed 11'. Steel-Concrete Highway Bridges, Earth Fill side slopes 1 1/2 to 1 on Private Property, Filled to Grade.
 COLUMN 4: O.-W. R. & N. Co.'s Tracks depressed 11'. Steel-Concrete Highway Bridges, Streets and adjacent Property filled to Grade.
 COLUMN 5: O.-W. R. & N. Co.'s Tracks elevated 20'. Through Ry. Steel Girders, no change in Street Grades.

VARIATIONS OF SAME PROPOSITION			LOCATION OF VIADUCT			NOT FEASIBLE		
1	2	3	E. 37th St. and Sandy Boulevard	E. 42nd Street	E. 47th Street	4	5	6
\$ 74,600	\$ 68,700	\$ 69,900				\$ 43,200	\$ 46,100	
31,000	31,700	31,800				21,700	22,100	
126,800	67,800	72,700				32,700	33,100	
28,100	26,100	26,100	E. 62nd St. & E. 63rd St.			18,500	20,000	
42,100	33,200	40,100	E. 60th Street			27,100	28,000	
96,000	54,000	80,000	Barr Road (Halley Street)			37,000	42,000	
47,700	31,000	45,400	E. 74th Street			18,400	20,000	
22,800	22,500	22,500	E. 82nd Street			18,100	20,000	
27,000	36,000	40,000	Damages to Adjacent Property			60,000	100,000	
2,700	2,700	2,700	Relying Tracks			2,700	2,700	
20,700	20,700	20,700	Relying Water Mains			27,300		
			Reconstruction of Sewer			10,800	1,000	
			TOTAL COST			\$415,000	\$236,600	
\$516,500	\$382,400	\$451,000						
10,000	160,000	160,000	Earthwork on Railroad Right of Way			\$70,000	\$80,000	
\$668,500	\$632,400	\$601,000	TOTAL COST OF REGRADE			\$75,000	\$716,000	
103,700	76,480	90,200	Proportion to be Paid by General Tax			\$3,000	167,320	
103,700	76,480	90,200	Proportion to be Paid by District Benefited			\$3,000	67,320	
461,100	379,440	420,600	Proportion to be Paid by O.-W. R. & N. Co.			619,000	581,900	
600,000	600,000	600,000	Cu. Yds. Earth in Ry. Prism Caused by Regrade			1,180,000	1,520,000	

Estimated prior to the passage of Ordinance No. 30776 establishing a minimum wage of \$5.00 per day for municipal work.

construction of the Sullivan Gulch trunk sewer or other sub-surface structures.

The partial elevation of highways will greatly improve their utility for traffic and make possible the elimination of many adverse grades which are an impediment to drainage. Property damages along the major portion of the regrade will be comparatively small because the locality is not highly improved. In several instances the structures will add materially to the appearance of adjoining property. The proposed track depression allows practical construction of industrial tracks and makes possible access, on a reasonable grade, to all the property along the gulch. In fact, the system chosen herein affords so many practical advantages as to place the other methods almost out of the question. Particularly is this true when considering the project from the only logical viewpoint—as an entirety.

A complete summary of the cost involved in the various methods is shown in Figure 2.

Anticipating that property owners will differ in choice of retaining walls or earth fills without retaining walls, along their building lines, and as decision will depend largely on the use to be made of the property, the office has prepared accurate contour maps, plans and estimates of cost of the different methods of dealing with the approaches, and is prepared to supply owners with accurate information. The office is also prepared to submit plans for industrial tracks at each particular location and invites all property owners and interested persons to confer with it as to the effect of the regrade on the future development of their property.

PLANS AND ESTIMATES OF COST.

Accompanying this discussion are plans for the crossing at East 37th Street and Sandy Boulevard, Figures 3 to 6, inclusive, together with an estimate of cost. Estimates of cost are also shown for each of the other structures in the table, Figure 2.

The viaduct at East Thirty-seventh Street has been visualized to large scale on an enlarged photograph. This clearly represents the final appearance of the structure and its effect on adjoining property. A reproduction is shown in Figure 7. The estimate of cost of the crossing at East Thirty-seventh Street includes the cost of a suspended footway for pedestrians and street car pas-

sengers, as the most satisfactory provision for such traffic during construction appears to be the establishment of a transfer point at the crossing. A considerable vehicle tonnage, amounting to nearly 900 tons per day of eight hours, is routed over Sandy Boulevard at present. As this tonnage consists partly of an average of 222 loaded auto trucks per day, a temporary crossing for such heavy traffic would be uneconomical. During construction it is advisable to divert all Sandy Boulevard vehicle traffic over the East 28th Street bridge to Broadway, until the present timber structure at East 33rd Street may be strengthened; when traffic can, with little inconvenience, be routed over it.

In the design of all structures, artistic as well as utilitarian considerations have governed and it has been the effort to produce structures which will make a pleasing entrance to the city. If full consideration be given the question of maintenance in relation to original cost, a type of structure will be selected conforming to its environment, making economical use of the material, of pleasing outline and proportion with appropriate but limited ornamentation—in short, one which will creditably serve and exhibit its purpose.

TECHNICAL FEATURES.

The viaduct at East Thirty-seventh Street is designed on a skew of $41^{\circ} 22'$, making the length of the bridge proper 133.25 feet, consisting of one main span of 41.31 feet and two spans of 22.65 feet, with two approach spans of 23.32 feet, each. This arrangement of spans will allow the railroad company to construct a 4-track system. The intersection at this crossing of Sandy Boulevard, Halsey and Chico Streets, necessitates the construction of seven approaches to the viaduct. Halsey Street crosses the right-of-way on a skew of $65^{\circ} 53'$, making it most impractical to construct the viaduct on this line; therefore it is proposed to acquire from the southerly portions of lots 1, 2, 3, 4 and 5, block 12, Hancock Street Addition, a total area of 6,660 square feet, to provide an approach to the viaduct. South of the right-of-way Halsey Street is now open for a width of 25 feet south of the center line of the roadway. It is proposed to open the north side of the street and approach the viaduct with a full-width improvement. Sandy Boulevard approaches the viaduct from the southwest on a 5% grade. This approach is 205 feet long.

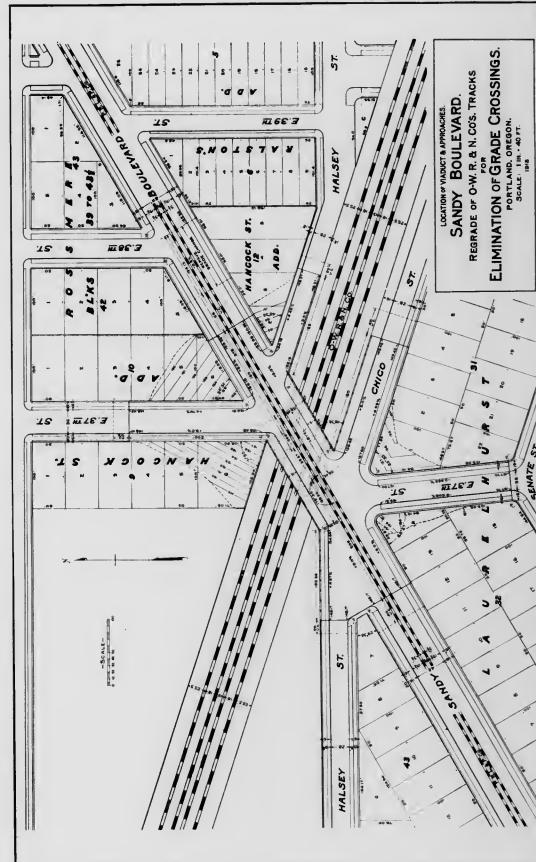


FIG. 3

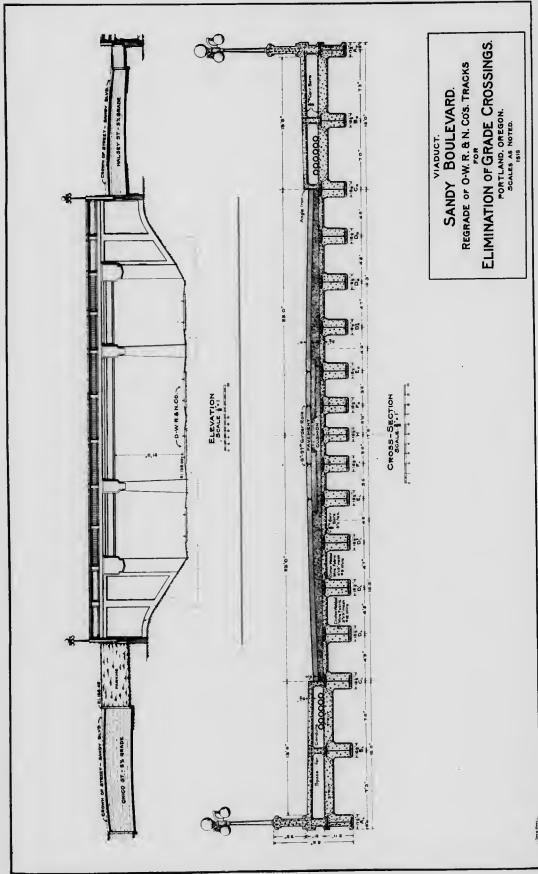


FIG. 4

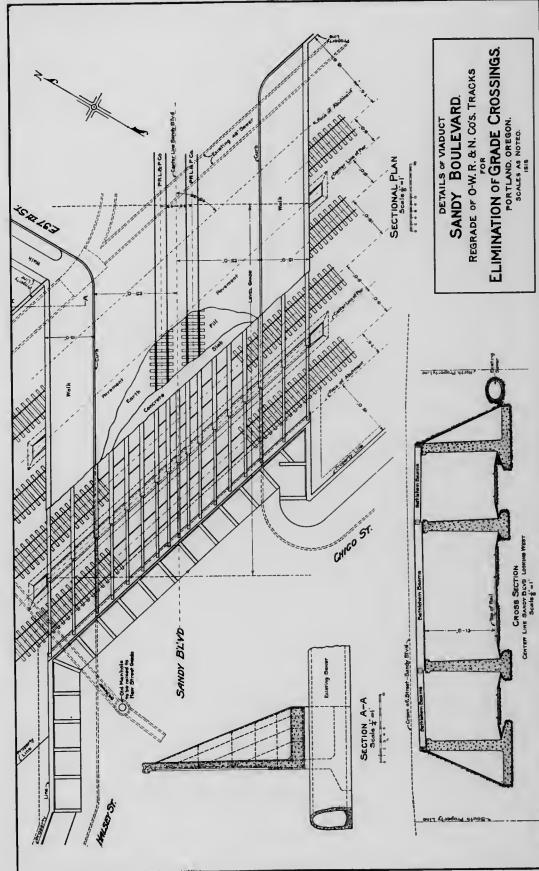


FIG. 5

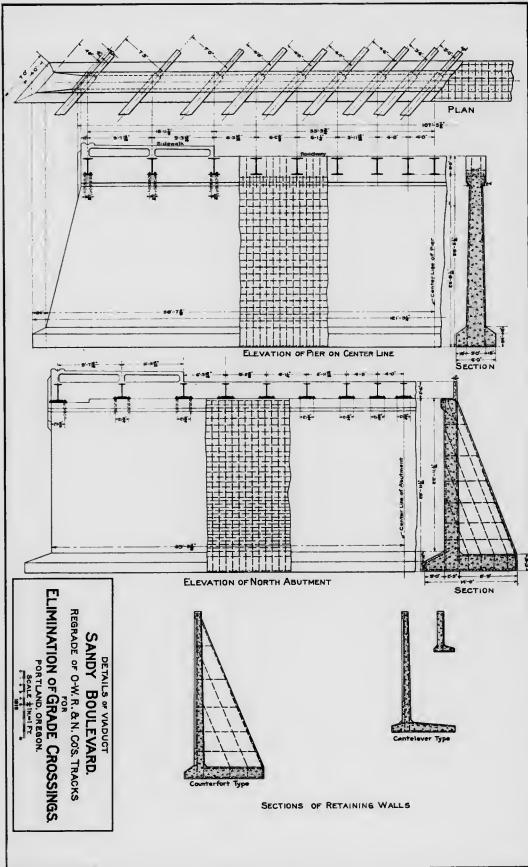


FIG. 6

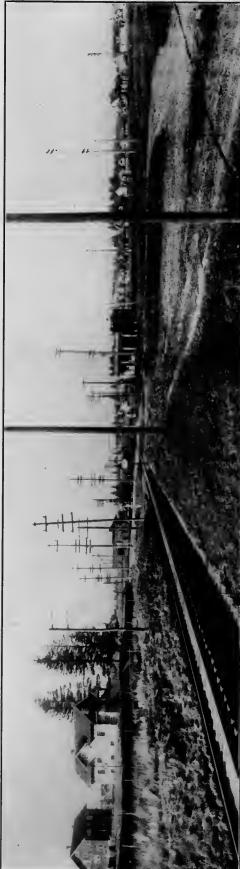
The northeast approach is 150 feet long with a maximum grade of 5%. It is proposed to regrade and repave Sandy Boulevard for a distance of 104 feet in order to eliminate the present adverse grade. This will greatly facilitate drainage and offer less resistance to traffic movement. East Thirty-seventh Street approaches the viaduct from the north on an easy gradient 200 feet long. The intersection of Senate and East 37th Streets, just south of the railroad, is at present established at an elevation greater than that of the proposed viaduct grade. This will enable access from Laurelhurst to be obtained on a descending grade of 0.6 of one per cent. The maximum grade of approaches at all crossings has not been allowed to exceed 5%.

With the exception of Halsey Street (Bart Road) where a structure of the through girder type has proven more economical under the conditions imposed, the accompanying plans are typical of the designs adopted for all the crossings. The main structural members consist of Bethlehem girder-beams encased in concrete, producing the most permanent and economical type of structure, while the general outline and proportions may be made to offer a very pleasing effect. The deck proper consists of a reinforced concrete, waterproof slab. An earth cushion laid directly upon the latter forms the subgrade for the pavement. Crushed rock ballast is provided on the East Thirty-seventh Street viaduct in order to obtain a proper and well-drained foundation for the street railway tracks. The effect of impact due to severe and heavy moving loads which would ordinarily be allowed for by a varying percentage of the live-load stresses, or by decreasing the intensities of working stresses below those allowed for statically applied loads, is greatly lessened by the interposed cushion. The static load imposed by the latter is, therefore, compensated while the existence of the cushion insures noiselessness, a most desirable feature in a residence district. In order to secure full working strength of the steel stringers, the compression flanges are allowed to project into the concrete slab, affording ample lateral stiffness in the longer spans. The sidewalks consist of reinforced concrete slabs laid in panels 15 feet in length and entirely independent of the supporting beams, allowing ample provision for temperature changes. The concrete handrail is cast in place with cold joints at each pilaster, and ornamental lamp standards are to be installed at suitable locations. Concrete struts

under the sidewalk area form supports for pipes, conduits and other utility features. Exposed surfaces of the structure are paneled in a pleasing manner and will be finished without the use of a cement-wash or plaster, insuring a durable surface.

CONCLUSION.

In conclusion I wish to say that our entire investigation has revealed no more important adjunct to the establishment of a general city plan for municipal betterment than the elimination of crossings at grade. The introduction of street railways and their intersection with lines of steam railroads, density of traffic and consequent industrial development, are increasing the complexity of the problem. These facts and the necessity of protection to life and property make early solution imperative. Its importance is recognized in every community and no better evidence of this fact may be had than the vast amounts expended in this country and abroad in accomplishing the separation of grades.



CROSSING AT EAST THIRTY-SEVENTH STREET AS IT NOW APPEARS



CROSSING AT EAST THIRTY-SEVENTH STREET AS IT WILL APPEAR AFTER SEPARATION OF GRADES

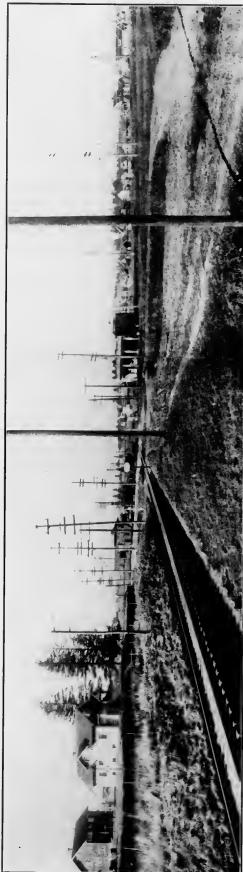
FIG. 7

INTENTIONAL SECOND EXPOSURE

under the sidewalk area form supports for pipes, conduits and other utility features. Exposed surfaces of the structure are paneled in a pleasing manner and will be finished without the use of a cement-wash or plaster, insuring a durable surface.

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CROSSING AT EAST THIRTY-SEVENTH STREET AS IT NOW APPEARS



CROSSING AT EAST THIRTY-SEVENTH STREET AS IT WILL APPEAR AFTER SEPARATION OF GRADES

FIG. 7

GENERAL SPECIFICATIONS

1—PLANS AND SPECIFICATIONS.

Plans and specifications are intended to be explanatory of each other. All dimensions, materials, "T" grades, etc., must be in full accordance with the specifications. The plans and specifications are intended to include everything, materials, work or skill which may be requisite to obtain complete and finished work, and everything, materials, work or skill, not herein particularly specified, but which may be fairly implied as included in the contract and as being necessary to render the work complete, of which the Engineer shall be the judge, shall be deemed to be included in the price bid by the contractor, and must be furnished or performed by the contractor without extra charge.

The Engineer shall determine the amount or quantity of the work which is to be paid for under this contract, and to decide all questions which may arise relative to the fulfillment of these specifications, as his estimates and decisions shall be final and conclusive; also, the said Engineer or his duly appointed representatives, acting for him, shall inspect the work to be done and see that it is strictly in accordance with the requirements of the specifications herein set forth.

During the progress of the work such working plans will be furnished from time to time as the Engineer may deem necessary. Under no circumstances shall dimensions be used that are not indicated by stakes set by the Engineer or by figures on the plan. No dimensions are to be scaled from the plans.

2—ADDITIONAL SPECIFICATIONS.

Such other specifications as may be required or deemed necessary by the Engineer to obtain complete and finished work and not herein shown or described will be filed prior to the publication of the advertisement for proposals and shall become a part of these specifications.

3—LINES AND GRADES, ETC.

All work during its progress and upon its completion must conform truly to the lines, grades and levels to be determined and given by the Engineer, and the Engineer's marks must be carefully preserved. Any stakes or marks which are unnecessarily disturbed shall be reset by the Engineer, but the cost of resetting such marks shall be deducted from the amount due the contractor.

4—CONCRETE.

Concrete shall conform to the standard specifications of the City of Portland for "Concrete in Forms" (No. 102). The class of concrete will be indicated on the plans.

5—REINFORCEMENT.

Steel reinforcement shall conform to the standard specifications of the City of Portland for "Steel Reinforcement" (No. 8). The class of reinforcing will be indicated on the plans.

6—STRUCTURAL STEEL.

Specifications will be provided in accordance with paragraph 2,
"Additional Specifications."

i—EXCAVATION.

EXCAVATION.
Excavation shall be carried to the depth required by the Engineer who shall be given an opportunity to inspect the foundation before placing concrete. Excavations shall be securely shored to prevent settlement or injury to neighboring property.

No excavation shall be paid for outside the lines established by the Engineer. Disposal of surplus material shall be included in price bid for excavation.

S—ADDITIONAL EXCAVATION.

EXCAVATION AND CONCRETE.
Excavation and concrete, additional to that shown on the plans or specifically indicated in the specifications, may be required by the Engineer and will be paid for as provided in the proposal.

9—BACKFILLING.

Backfilling shall be deposited in light loads and thoroughly tamped in layers not to exceed 6 inches in depth. Water shall be used only as directed by the Engineer. Earth for backfilling must be free from vegetable matter or other foreign material.

10—ENCOUNTERING OBSTACLES.

The contractor must remove timbers, boulders or other obstacles encountered. No extras will be allowed for any unusual conditions, except such as require additional concrete, as elsewhere provided.

11—ERECTION.

All materials, tools, appliances, machinery and suitable labor necessary for the erection of the structure according to plans and specifications shall be provided by the contractor.

12—GUARDS.

Contractor shall provide danger signals and barricades to warn the public of any danger that may arise from any of his operations.

13—AGENTS.

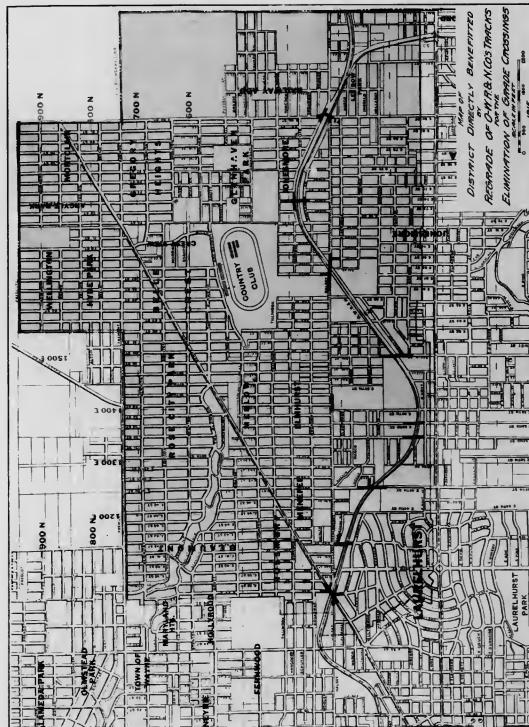
At all times when work is in progress, either the contractor himself, or a competent foreman, must be in direct charge of the work. A complete set of plans and specifications must also be kept upon the work, and any orders given to a foreman or superintendent will be considered as having been given to the contractor.

14—RIGHT OF WAY.

The contractor shall not enter upon or occupy with men, tools or material, any lands outside of public streets or roadways, or the right-of-way of lands secured by the City, without having first acquired, at his own expense, the right to do so from the proper parties. He will be held responsible for any damage done by him or any of his employees to any adjoining property or premises.

15—SANITATION.

The contractor shall provide sanitary conveniences for the workmen.



16—CONTRACTOR'S LIABILITY.

The contractor shall protect the city against all claim for damages arising out of any of his operations. He shall assume all risk or loss by flood or other causes during construction. He shall protect the city against liens or judgments arising out of failure on his part to settle claims for damages or purchases.

17—EMPLOYER'S LIABILITY.

The contractor will be required to indemnify himself against accidents to his employees by purchasing an employer's liability policy covering the work.

18—SURETY BOND AND GUARANTEE.

The contractor will be required to file a surety company bond in an amount equal to the total amount of his bid as based on the quantities named in the proposal, guaranteeing the execution and complete performance of the contract in accordance with the plans, specifications and bid. Such bond shall also include a clause specifically setting forth that the contractor will guarantee the proposed work against failure on account of defects of workmanship and material, for a period of one year after completion.

19—INSPECTION.

All materials and methods of construction shall be subject to inspection and approval by the Engineer, who shall control as to interpretation. Any material or workmanship may be rejected by the Engineer any time before time of acceptance, and the contractor shall make good all deficiencies at his own cost. The fact that authorized inspectors have accepted said material and workmanship shall not relieve the contractor from liability for the cost of replacing the same with material or workmanship acceptable to the Engineer on final inspection. Nothing will, however, be done by the Engineer or inspectors to give the contractor needless worry or annoyance. The intent of both inspection and specifications is simply to obtain for city a structure that will be first-class in every detail.

20—DEFECTIVE WORK.

The contractor, upon being so directed by the Engineer, shall remove, reconstruct or make good, without charge, any work which the Engineer may consider to be executed defectively. The fact that any defective material has been accepted previously by oversight of the city's inspectors shall not be considered a valid reason for the contractor's refusing to replace it.

21—FEES, ROYALTIES, ETC.

All fees or royalties for any patented invention, articles or arrangement that may be used upon, or be in any manner connected with the work, or any part thereof, to be done under these specifications, shall be included in the price named in the proposal, and the contractor shall protect and hold harmless the city against any and all demands for such fees or royalties, and before final payment is made the contractor must furnish acceptable proof of a proper and satisfactory release from all such claims.

22—ORDINANCES.

The contractor shall comply with all laws and ordinances of the city affecting the work, shall procure the necessary permits and licenses and pay all fees connected therewith and shall give proper notice to all other corporations, firms or individuals whose interest may in any way be affected by his operation.

23—SUB-CONTRACTOR.

The contractor shall be held entirely responsible for all work and no sub-contractor will be recognized in any way.

24—INCOMPETENT WORKMEN.

The contractor shall be required to employ only competent and efficient laborers and first-class mechanics or artisans for every kind of work, and he shall be required to discharge and not again employ without the consent of the Engineer any employee of his who used profane or abusive language to any officer or employee of the city employed to oversee or superintend any work upon which such contractor's employee is engaged, or any employee of his who impedes or embarrasses any employee of the said city in the performance of his duty, or any employee of his who, in the opinion of the Engineer, is careless or incompetent, or who obstructs the progress of the work or disobeys or evades the instructions of the Engineer or inspector on the work.

25—UNAVOIDABLE DELAYS.

Should the work be delayed by weather conditions or by strikes, order of court, or delay of railroads in transporting material, or should the prosecution of the work be delayed by the Engineer or by other causes beyond control of the contractor, then an extension of time shall be allowed, equivalent to such delay. In the case of alterations by the Engineer, an extension of time will be allowed, provided, however, that the contractor shall give immediate notice in writing to the Engineer of the cause of the detention.

26—SPIRIT OF THE SPECIFICATIONS.

The nature and spirit of these specifications are to provide for the work herein enumerated to be fully completed in every detail for the purpose designed, and it is hereby understood that the contractor in accepting the contract agrees to furnish any and everything necessary for such construction, notwithstanding any omission in the drawings or specifications.

27—FINAL CLEARING.

After completion, the contractor shall remove all false work, surplus material, refuse matter and debris from the premises affected by his contract.

28—EXTRA WORK.

No claim for extra work will be considered or allowed unless said work has been previously ordered by the Engineer, in writing. The price bid for such extra work as may be ordered by the Engineer, as above, shall be actual cost to the contractor for material and labor, plus 15% for tools, appliances and profit.

29—GENERAL PROVISIONS.

It is hereby stipulated that if the work to be done under these specifications shall be abandoned, or if the contract shall be sublet or assigned by the contractor, or if any of the moneys or orders payable thereunder shall be assigned, otherwise than as herein provided, or if, at any time, the Engineer is of the opinion, and shall so certify in writing to the Council, that the work is unnecessarily or unreasonably delayed, or that the contractor is wilfully violating the terms, covenants and agreement of the contract, or is not executing

the contract in good faith, then the Council shall have the right to notify the contractor to discontinue said work, or such part thereof as the Council may designate, and to take possession of the work and either relet the same by contract or furnish the necessary tools and appliances for completing the said work under the direction of the Engineer, and if the cost of so completing the work, or any part thereof, is less than the amount due the contractor upon his contract, the amount left, after deducting all the expenses for so completing the work shall be paid to the contractor or his assigns, but if the cost is greater than the amount due the contractor upon his contract, then the contractor, or the sureties upon his bond, shall pay to the city the amount of money that the expense of so completing the work exceeds the amount due upon the contract.

In lieu of the exercise of the power heretofore given, in case the contractor fails to employ workmen, purchase tools and materials and complete the work, the Council reserves the right and option to annul and cancel the contract and relet the work, or any part thereof, and the said contractor shall not be entitled to any claim for damages on account of said annulment, nor shall such annulment debar the city from the right to recover damages which may arise on account of the failure of the contractor to fulfill the terms of the contract; and in case of such annulment, all moneys due the contractor or retained under the terms of the contract shall be held as a fund for the purpose of paying the expenses of completing the work, but such forfeiture shall not release the contractor or his sureties from the fulfillment of the contract, and they shall be liable to the city for any greater sum in which the cost of the completed work exceeds the amount of the original contract.

30—CITY.

Wherever in these specifications the term "City" is employed, it is understood to mean the City of Portland, Oregon.

31—ENGINEER.

Wherever in these specifications the term "Engineer" is employed, it is understood to mean the City Engineer of the City of Portland, or his duly authorized representative.

32—CONTRACTOR.

Wherever in these specifications the term "Contractor" is employed, it is understood to mean the person or persons to whom the contract has been awarded.

DESCRIPTION OF AREA DIRECTLY BENEFITED.

Following is a description of the district that may be considered to be directly benefited by the proposed grade crossing elimination.

The East 37th Street viaduct unquestionably benefits the entire area east of East 37th Street north of Sandy Boulevard to the city limits and south of Sandy Boulevard to Sullivan's Gulch. That area lying between the south line of Sullivan's Gulch and East Glisan Street may be said to be generally benefited by the other crossings as proposed in the discussion. It does not seem just to extend the south line of the assessment district beyond East Glisan Street. All traffic originating south of this main thoroughfare is afforded direct access to the western portions of the city without crossing the O.W. R. & N. Company's tracks. Excepting that portion of Laurelhurst now served by the crossing, the territory west of East 37th street, although receiving an indirect benefit, may not be properly included within the district.

The area directly benefited, as described herein and shown on the accompanying map, comprises about 14,000 lots, making the assessment for each lot about \$6.50, provided every lot be assessed an equal amount. This, of course, would not be entirely equitable as the property in the immediate vicinity of the proposed improvement receives somewhat greater benefits. Owing to the comparatively small districts south of the O.W. R. & N. Company's tracks, and inasmuch as the grade separation at East 37th Street necessitates a track depression as far east as East 99th Street, it seems reasonable to consider that the property in the vicinity of those crossings east of East 37th Street should not be required to bear entirely the proportionate cost of each respective viaduct. Although the danger now existing at these crossings cannot be doubted, the accomplishment of the separation of grades at East 37th Street would, in effect, entirely close these cross streets unless some means be provided for passage over the railroad right-of-way. A portion of the cost of these consequential crossings distributed over the large area directly benefited by the crossing at East 37th Street would, therefore, seem entirely equitable. The increase in the amount of assessment thereby imposed on each individual lot in this large district need not be very small in order to materially reduce the burden that would otherwise be imposed on that property comprising the smaller districts.

In establishing the general district, the topography of the area and results of a careful traffic survey, have been the controlling factors.

DESCRIPTION OF ASSESSMENT DISTRICT.

Beginning at the point of intersection of the east line of Irene Heights extended northerly, with the center line of Fremont Street; thence east to the southwest corner of Section 19, T. 1 N. R. 2 E.; thence east along the city boundary line to the southwest corner of Section 20, T. 1 N. R. 2 E.; thence north along the city boundary line to the quarter section corner between Sections 19 and 20, T. 1 N. R. 2 E. W. M.; thence east along the city boundary line to the one-quarter corner between Sections 20 and 21, T. 1 N. R. 2 E. W. M.; thence south along the city boundary line to the northwest corner of Section 28, T. 1 N. R. 2 E. W. M.; thence east along the city boundary line to the northeast corner of the northwest quarter of Section 28, T. 1 N. R. 2 E. W. M.; thence south along the city boundary line to a point 360 feet north of the north line of East Glisan Street; thence west to the northwest corner of lot 9, block 2, Sanford; thence west parallel to the north line of East Glisan Street to the east line of East 82nd Street; thence west to the northeast corner of lot 9, block 1, North Villa; thence west to the northwest

corner of lot 16, block 2, North Villa; thence west to the northeast corner of lot 14, block 3, North Villa; thence west to the northwest corner of lot 25, block 3, North Villa; thence west to the northeast corner of lot 7, block 4, North Villa; thence west to the northeast corner of lot 2, block 17, Braillard; thence westerly to the northeast corner of lot 36, block 4, Braillard; thence west to the northwest corner of said lot 36; thence south along the east lines of lots 11 and 12, block 4, Braillard, to a point 287.5 feet south of the south line of Oregon Street; thence west, parallel to the south line of Oregon Street to the east line of East 71st Street; thence northwesterly to the southeast corner of lot 1, block 18, Jonesmore; thence west to the southwest corner of lot 14, block 18, Jonesmore; thence southwesterly to the northeast corner of lot 11, block 17, Jonesmore; thence west to the northwest corner of said lot 11; thence south along the west line of Jonesmore to a point 337 feet north of the north line of East Glisan Street; thence west parallel to the north line of East Glisan Street, to the east line of block 6, Parkhurst; thence north to the northeast corner of lot 5 in said block 6; thence west to the northwest corner of said lot 5; thence north along the east line of East 64th Street, to a point 175 feet south of the south line of Oregon Street; thence west parallel to the south line on Oregon Street, to the west line of lot 4, block 2, Barrett's Addition; thence south parallel to the west line of Sheldon Street, to the north line of East Hoyt Street; thence southwesterly to the northeast corner of lot 7, block 4, Barrett's Addition; thence south to the southeast corner of said lot 7; thence west parallel to the south line of East Hoyt Street, to the west line of East 50th Street; thence west to the northeast corner of lot 4, block 1, Golden Park Addition; thence west parallel to the south line of East Hoyt Street, to the east line of East 49th Street; thence northwesterly to a point on the west line of East 49th Street, 100 feet north of the north line of East Glisan Street; thence west parallel to the north line of East Glisan Street to the east line of East 47th Street; thence northwesterly to the southeast corner of lot 4, block 1, Maple Hill Place; thence west to the southwest corner of lot 3, block 2, Maple Hill Place; thence west to the southeast corner of lot 13, block 65, Laurelhurst; thence west to the southwest corner of lot 12 of said block 65; thence south to the southeast corner of lot 11, said block 65; thence southwesterly along the southerly lines of lots 11, 10, 9, 8 and 7 to the most southerly corner of lot 7, said block 65; thence westerly to the most westerly corner of lot 7, said block 65; thence west to the most northerly corner of lot 11, block 65, Laurelhurst; thence southwesterly to the most southerly lines of lots 10 to 1, inclusive of said block 65, to the east line of East 41st Street; thence west to the southeast corner of lot 7, block 67, Laurelhurst; thence westerly along the southerly line of lots 7, 6, 5, 4, 3 and 2, to the most northerly corner of lot 16, said block 67; thence southwesterly to the most westerly corner of said lot 16; thence west to the most southerly corner of lot 10, block 1, Laurelhurst; thence northwesterly to the most westerly corner of said lot 10; thence southwesterly along the easterly lines of lots 5, 4 and 3, said block 1, to the most southerly corner of lot 3, said block 1; thence northwesterly to the most westerly corner of said lot 3; thence westerly to the most southerly corner of lot 14, block 2, Laurelhurst; thence westerly to the most westerly corner of said lot 14; thence southwesterly to the most southerly corner of lot 5, said block 2; thence northwesterly to the most westerly corner of said lot 5; thence westerly to the most southerly corner of lot 12, block 6, Laurelhurst; thence westerly to the most westerly corner of said lot 12; thence northerly along the easterly lines of lots 6, 7, 8 and 9 of said block 6 and the easterly lines of lots 1, 2, 3, 4 and 5, of

block 5, Laurelhurst, to the most easterly corner of lot 5, said block 5; thence northerly to the most northerly corner of said lot 5; thence northwesterly to the most southerly corner of lot 17, block 8, Laurelhurst; thence northwesterly to the most westerly corner of lot 7, said block 8; thence northerly to the most easterly corner of lot 17, block 11, Laurelhurst; thence northwesterly to the most northerly corner of said lot 17; thence northeasterly to the most easterly corner of lot 6, said block 11; thence northwesterly to the most northerly corner of said lot 6; thence northerly to the most easterly corner of lot 15, block 21, Laurelhurst; thence northwesterly to the most northerly corner of said lot 15; thence easterly to the most southerly corner of lot 6, said block 21; thence northerly to the most westerly corner of said lot 6; thence northwesterly to the most easterly corner of lot 7, block 23, Laurelhurst; thence northwesterly to the southeast corner of lot 5, of said block 23; thence west to the southwest corner of lot 4, said block 23; thence north to the northwest corner of said lot 4; thence north to the southwest corner of lot 19, block 26, Laurelhurst; thence north to the northwest corner of said lot 19; thence west to the southwest corner of lot 7 of said block 26; thence north to the northwest corner of said lot 7; thence northwesterly to the southeast corner of lot 22 of block 35, Laurelhurst; thence north to the northeast corner of said lot 22; thence westerly to the northwest corner of said lot 22; thence northwesterly to the northwest corner of lot 6, said block 35; thence northwesterly to a point in the north line of Wasco Street, 283 feet east of the east line of East 33rd Street; thence north parallel to the east line of East 33rd Street, to the south line of the right-of-way of the O.W.R. & N.C.; thence easterly along the southerly line of said right-of-way to the point of intersection of the southerly line of said right-of-way with a line parallel to and lying 535 feet west of the west line of East 37th Street; thence north parallel to the west line of East 37th Street to a point 100 feet north of the north line of Tillamook Street; thence east to the southwest corner of lot 2, block 28, Rossmere; thence north along the west line of Rossmere to the north line of Rossmere; thence east to the southwest corner of lot 7, block 42, Beaumont; thence north along the west line of Beaumont to the south line of Morris Street; thence northward to the southwest corner of lot 10, block 9, Maryland Heights; thence northward along the easterly lines of lots 10, 9, 8, 7, 6, 5 and 4 of said block 9 to the northeast corner of lot 4 of said block 9; thence westerly to the southeast corner of lot 3 of said block 9; thence north to the northeast corner of said lot 3; thence northeasterly to the southeasterly corner of lot 15, block 1, Maryland Heights; thence north to the northeast corner of said lot 15; thence west to the southwest corner of lot 2, said block 1; thence north to the northwest corner of said lot 2; thence northeasterly to the southwest corner of lot 9, block 3, Irene Heights; thence north to the northwest corner of said lot 9; thence east to the southeast corner of lot 7, said block 3; thence north along the east line of Irene Heights and its northerly extension to the point of beginning.

SECTION 3724 OF THE CHARTER OF THE CITY OF PORTLAND, OREGON.

"(a) The Council shall have the right, power and authority to determine whether any railroad crossing of any street or highway within the corporate limits of the City of Portland is dangerous, and to provide for the elimination of any grade crossing of any railroad on such street or highway whenever, in the opinion of the Council, it is necessary to eliminate the same.

"(b) Whenever the Council shall deem that any crossing of a railroad and street or public highway is dangerous to public safety the Council may by ordinance require the City Engineer to prepare plans and specifications for, and estimates of, the cost of making such change as will eliminate such grade crossing.

"(c) The City Engineer, upon being required to prepare such plans, specifications and estimates, shall confer with the civil engineer of the railroad company representing such railroad in said city for the purpose of determining upon a reasonable plan and method for eliminating such grade crossing, and in the event that said City Engineer is unable to agree with the Engineer of such railroad company as to said matter, the City Engineer shall thereupon proceed to determine upon a proper and reasonable plan and method of eliminating said grade crossing: Provided, however, that in the event two or more railroads, or one or more interurban or urban car line or lines are affected by such proposed change of grade the City Engineer shall confer with the civil engineer of each of such companies for the purpose of determining upon a reasonable plan or method of eliminating such grade crossing: Provided, further, that in the event the City Engineer shall be unable to agree with such engineers he shall proceed to determine on a reasonable plan for the elimination of such grade crossing: And provided, further, that in the event such civil engineers, or any of them, shall neglect to confer with the City Engineer after ten days notice in writing, the City Engineer shall proceed with the preparation of such plans, specifications and estimates without such conference.

"(d) When a plan is determined upon as herein provided the City Engineer shall file with the Auditor at his earliest convenience, and within such time as may be fixed by the Council by ordinance, the report on such matter, with the necessary plans, specifications and estimates of the cost thereof, and upon the filing thereof the Auditor shall immediately notify in writing the railroad, interurban or street railway companies interested of such filing, and each of such companies shall have thirty days from the date of the receipt of such notice within which to file with the Auditor objections thereto, or to propose modifications thereof, or to file other or different plans and specifications, together with the estimates of the cost thereof: Provided, however, that the City Engineer shall not neglect the filing of plans, specifications and estimates therefor because of the inability of the engineers of such companies to agree, or their failure or neglect to confer with him in regard to the same or their neglect to attend such conference as the City Engineer may call.

"(e) The Council, at any regular meeting held within three months after the expiration of said thirty-day period mentioned in paragraph d' hereof, shall consider the report, plans, specifications and estimates filed, and may refer the same to a committee thereof, in which event the Auditor shall give five days notice in writing to the company or companies interested when such committee will consider said matter, which notice must be mailed to such company or companies, and at the time specified said company or companies may attend and be heard thereon, and thereafter such committee shall make

its report containing its findings and recommendations to the Council, and thereafter the Council shall select from said plans so submitted the plan and method for eliminating said grade crossing and adopt specifications therefor, or dismiss said proceedings. Upon the determination by the Council of the manner of eliminating such grade crossings if it appear that a change of grade be required upon any portion of such street or road, it shall determine whether such grade shall be changed with or without considering damages to adjacent property. If it determine to consider damages to adjacent property it shall require the City Engineer to determine and report to the Council the amount of damages which such property may sustain by reason of the change of such grade. The basis for the determination of such damages shall be the depreciation, if any, in the market value of such property on account of such change of grade, and in reckoning such depreciation of the market value the City Engineer shall take into account the net benefits, if any, and the effect which such proposed improvement will have upon the market value of such property, and also the profitable amount of the assessment which may be placed against such property on account of the making of such improvement. The City Engineer shall, at his earliest convenience, file with the Auditor a report in writing setting forth the amount of damages which the owners of the lots, blocks and parcels of land affected by such change of grade will, in his opinion, sustain thereby.

(f) Upon the filing of such report the Auditor shall forthwith publish in the city official newspaper a notice that such report has been filed and shall state the amount of damages sustained by each property owner, specifying the property for which such damage is allowed. Such notice shall be published for four consecutive insertions in the city official newspaper. Said notice shall also state the date when said report of the City Engineer will be heard by the Council, which date shall be not less than five days from the date of last publication of such notice, and shall further state that objections thereto may be made in writing and filed with the Auditor at any time prior to the day of such hearing. At the time fixed for such hearing the Council shall hear and consider said report and all objections and remonstrances thereto, or may refer the same to any committee which shall further consider the same, hear all evidence offered and report thereon to the Council, and at any time thereafter the Council shall determine the amount of damages to be awarded to any or all persons on account of such change of grade. An appeal may be taken from the act of the Council to the Circuit Court of the State of Oregon for the County of Multnomah, but such appeal shall be prosecuted within twenty days after the determination of the damages, if any, by the Council. Such appeal shall be taken by serving notice of appeal upon the City Attorney and filing the same with proof of service, together with an undertaking in sum or more sufficient who shall have the qualifications and securities of appeal from the Circuit Court to the Supreme Court; and if excepted it shall justify in like manner conditioned that such appellant will pay all costs and disbursements that may be awarded against him on appeal. The City of Portland shall be considered the plaintiff and such appeal shall be conducted and be heard and determined, as far as practicable, in the same manner as an action at law. The jury shall view the property in question and its verdict shall be a final and conclusive determination of the question of damages. The cost of making such change and improvement determined upon by the Council, or by the jury on such appeal, shall be apportioned as follows: Sixty per cent thereof shall be paid by the railroad company owning or controlling such railroad at such crossing, and twenty per cent thereof by the City of Portland from its Special Bridge Fund, and twenty per cent thereof shall be assessed against the property benefited thereby and comprised within a district to be fixed or determined upon by the Council and in arriving at the

cost of such change and improvement the raising or lowering of the track or tracks involved shall not be included in said percentage to be paid by said City and by the property in said improvement district except as to the extent embraced within the boundaries of such street or highway, but all other costs and expenses including the abutting property damaged shall be included, and whenever said street or highway is occupied or used by another railroad, streetcar, interurban or intercity railway company or companies, and whenever said street crosses more than one railroad and the same are embraced and included within the same improvement, then sixty per cent to be paid by such railroad shall be apportioned among all of the railroads, street car and interurban railway companies affected by such change, and in addition to such sixty per cent so to be apportioned among said companies, the cost and expense resulting from the raising or lowering of the tracks of said companies, or any of them, shall be likewise apportioned among all of said companies but the proportion of said sixty per cent and of such additional cost of raising or lowering the grades or tracks to be borne by each of said respective companies shall be determined by the Council unless said interested companies within thirty days after the final determination of the Council ordering said improvements shall file with the Auditor their mutual agreement thereon.

(g) In case of the allowance of damages to adjacent property, by reason of such change of grade the City shall, upon final determination of the amount to be awarded to each property owner as soon as can reasonably be done, transfer from the Special Bridge Fund of the City, or any other available fund, to the special assessment fund to be created as hereinafter provided, an amount sufficient to pay all such awards of damages, and thereupon warrants shall be drawn in favor of the various parties entitled thereto, in the respective amounts awarded, which warrants shall be payable upon demand, together with interest thereon from the date thereof at the rate of six per cent per annum, and shall be delivered to such persons upon their application therefor as hereafter provided; and from the time that such warrants are drawn such city shall have power and authority to proceed with the making of such changes and improvements, but none of such warrants shall be delivered until all such property owners, who have been allowed damages, file their written acceptance of such allowance, or the time for contesting the same shall have expired without any contest, or until any and all contests shall have been finally determined. The advancement herein provided for, together with interest thereon at the rate of six per cent per annum from the date thereof, shall be deemed a part of the cost of such alteration and improvement and shall be included in the apportionment hereinbefore specified, and the amount of such advancement, together with interest as aforesaid, shall be returned to the fund from which the same was advanced, excepting, however, twenty per cent thereof which is to be borne and discharged by said City as above provided.

(h) The Council shall, before adopting plans and specifications for such work, by resolution describe the property benefited thereby and to be assessed for the portion of the cost thereof above specified, and notice of the adoption of such resolution shall be given in the same manner as is stated in Section 376 of said charter, and remonstrances may be made by property owners, but such property owners shall not have the right by remonstrances to veto or defeat such proposed improvement. Said remonstrances shall be filed with the Auditor within the time to be fixed by said resolution and upon the expiration of such time the Council shall determine whether or not to proceed with said matter. If it determine to proceed it shall by ordinance fix such assessment district and fix the time and manner of making such change and improvement and adopt plans and specifications therefor as provided by paragraph "e" of this act. A contract or contracts for

the doing of such work and the furnishing of such material as may be necessary under the plans and specifications therefor adopted for the purpose of making such change and improvement shall thereupon be made, which contract shall be awarded, entered into and the work inspected and accepted and the assessment of that portion of the cost assessable against the property within the assessment district made in the same manner and with the same effect as is or may be provided by charter for street improvements, but such contract shall not embrace the work of raising or lowering the railroad tracks beyond the marginal lines of the street or highway. Assessments made as herein provided shall be entered in the docket of city liens in the same manner as is or may be provided by the charter for the collection of street assessments and the amount to be paid by said railroads, street railways and urban companies shall also be entered in the docket of city liens and shall constitute a lien against any real property of each of such companies in the City of Portland including its rights of way, depots, freight yards and stations and if any such company or companies fail to pay or bond the same within the time provided for paying or bonding assessments for street improvements, the City may proceed by mandamus to require the payment thereof, or may proceed to collect the same by a suit or action or in the same manner as other assessments are or may be collected as provided by the charter in the matter of the collection of delinquent street assessments or by any and all of such methods.

"(i) Any and all persons whose property may have been assessed for such improvement including such company or companies, shall have the right to bond such assessments in the same manner as is or may be provided by the charter for bonding assessments. No formal proceedings shall be required or had relative to changing the grade of such road or street further than herein specified, and upon the completion of such improvement, the grade of such road or street shall be duly altered and changed in accordance with the grade established by the provisions of this act, and the City Engineer shall make suitable record thereof.

"(j) Nothing in this Act shall impair the right of the City of Portland to require any street car company or companies, or railroad company or companies having a franchise on any such street or road to pay for the cost of paving and improving such portion of such street or road as may be provided by the franchise of such company or otherwise.

"(k) The remedy provided by Sections 365 to 372 inclusive of Article III, Chapter VI of the Charter providing for the establishment and change of grades shall in no manner be affected by this Act, but the provisions of this act shall be construed as an additional remedy thereto and shall apply only to the elimination of railroad grade crossings on public streets and highways."

Passed at Election of June, 1913.

MISH 20259

**END OF
TITLE**